



Can Obviously Intoxicated Patrons Still Easily Buy Alcohol at On-Premise Establishments?

Traci L. Toomey, Kathleen M. Lenk, Dawn M. Nederhoff, Toben F. Nelson,
Alexandra M. Ecklund, Keith J. Horvath, and Darin J. Erickson

Background: Excessive alcohol consumption at licensed alcohol establishments (i.e., bars and restaurants) has been directly linked to alcohol-related problems such as traffic crashes and violence. Historically, alcohol establishments have had a high likelihood of selling alcohol to obviously intoxicated patrons (also referred to as “overservice”) despite laws prohibiting these sales. Given the risks associated with overservice and the need for up-to-date data, it is critical that we monitor the likelihood of sales to obviously intoxicated patrons.

Methods: To assess the current likelihood of a licensed alcohol establishment selling alcohol to an obviously intoxicated patron, we conducted pseudo-intoxicated purchase attempts (i.e., actors attempt to purchase alcohol while acting out obvious signs of intoxication) at 340 establishments in 1 Midwestern metropolitan area. We also measured characteristics of the establishments, the pseudo-intoxicated patrons, the servers, the managers, and the neighborhoods to assess whether these characteristics were associated with likelihood of sales of obviously intoxicated patrons. We assessed these associations with bivariate and multivariate regression models.

Results: Pseudo-intoxicated buyers were able to purchase alcohol at 82% of the establishments. In the fully adjusted multivariate regression model, only 1 of the characteristics we assessed was significantly associated with likelihood of selling to intoxicated patrons—establishments owned by a corporate entity had 3.6 greater odds of selling alcohol to a pseudo-intoxicated buyer compared to independently owned establishments.

Conclusions: Given the risks associated with overservice of alcohol, more resources should be devoted first to identify effective interventions for decreasing overservice of alcohol and then to educate practitioners who are working in their communities to address this public health problem.

Key Words: Alcohol, Intoxication, Responsible Alcoholic Beverage Service, Bars, Restaurants.

ALCOHOL ESTABLISHMENTS DIRECTLY influence the blood alcohol content (BAC) levels of their customers through their serving practices. Functional impairment, risk, and incidence of alcohol-related problems increase with increased BAC levels (Fell and Voas, 2014; Moskowitz et al., 1985; Savola et al., 2005). Excessive consumption of alcohol at licensed establishments leads to high BAC levels and has been directly linked to specific alcohol-related problems such as traffic crashes and violence. Individuals stopped for drinking and driving often report on-premise establishments (i.e., bars and restaurants) as the most recent location where they consumed alcohol (Cotti et al., 2014; Naimi et al., 2009). As BAC and impairment levels increase, customers are more likely to be involved in aggressive events within establishments (Graham and Wells,

2001; Graham et al., 2006). Professional service staff who provide alcohol to individuals who show obvious signs of intoxication (i.e., overservice) contribute to these problems, and this practice is prohibited by law in 48 states in the United States (Mosher et al., 2009).

Historically, most on-premise alcohol establishments in the United States and other countries have had a high likelihood of selling alcohol to obviously intoxicated patrons (Andréasson et al., 2000; Buvik, 2013; Freisthler et al., 2003; Gosselt et al., 2013; Lenk et al., 2006; Toomey et al., 1999, 2004), despite state laws prohibiting alcohol sales to these individuals (Aiello, 1998). Several studies have been conducted over the past few decades in the United States to assess the likelihood of these illegal sales using pseudo-intoxicated purchase attempts (i.e., actors attempt to purchase alcohol while acting out obvious signs of intoxication). In 1990, McKnight and Streff (1994) found that 83% of establishments assessed in Michigan sold to the pseudo-intoxicated buyers prior to an intervention. During the late 1990s and early 2000s, researchers, using protocols similar to the protocol used in the McKnight and Streff (1990) study, found that establishments in Minnesota and California, sold alcohol to pseudo-intoxicated patrons 58 to 83% of the time (Freisthler et al., 2003; Lenk et al., 2006; Toomey et al., 1999, 2004). Toomey and colleagues (2005, 2008a) also

From the Division of Epidemiology and Community Health (TLT, KML, DMN, TFN, AME, KJH, DJE), School of Public Health, University of Minnesota, Minneapolis, Minnesota.

Received for publication April 8, 2015; accepted December 7, 2015.

Reprint requests: Traci L. Toomey, PhD, Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, 1300 S. Second St. Suite 300, Minneapolis, MN 55454; Tel.: 612-626-9070; Fax: 612-624-0315; E-mail: toome001@umn.edu

Copyright © 2016 by the Research Society on Alcoholism.

DOI: 10.1111/acer.12985

found a high rate of alcohol sales to pseudo-intoxicated buyers at community festivals (89%) and professional sport stadiums (74%).

To guide development of interventions to prevent illegal sales of alcohol to obviously intoxicated patrons, researchers have attempted to identify factors associated with these types of alcohol sales. Often studied are characteristics of the buyers, servers, managers of alcohol establishments, the establishments, and the communities surrounding the alcohol establishments. While individual studies have all identified factors associated with the purchase attempt outcome in their study, only the perceived age of the seller appears to be consistently associated with purchase attempt outcomes across the studies. Younger appearing (under age 30) servers were more likely to serve alcohol to pseudo-intoxicated buyers than older appearing servers in 2 studies (Freisthler et al., 2003; Toomey et al., 2004).

Given the risks associated with overservice of alcohol and the need for up-to-date data, it is critical that we monitor the likelihood of sales to obviously intoxicated patrons. It is also important to investigate current factors most associated with the propensity for these illegal alcohol sales to guide interventions focusing on preventing such sales. This study specifically addresses the following research questions: (i) What is the current likelihood of sales to obviously intoxicated patrons? and (ii) What factors are associated with likelihood of an establishment selling alcohol to an obviously intoxicated patron?

MATERIALS AND METHODS

This study describes baseline results from a randomized controlled trial designed to evaluate effects of a management training program promoting responsible alcohol service in bars and restaurants in a large Midwestern metropolitan area. The primary outcome measure for this study was pseudo-intoxicated purchase attempts, which was chosen because it represents an objective assessment of the propensity of on-premise establishments to sell alcohol to obviously intoxicated patrons. While other measures of overservice of alcohol have been used in other studies (e.g., purchasing several drinks within a short period of time), Saltz and Stanghetta (1997) concluded that pseudo-intoxicated purchase attempts provide a quicker and clearer test of training effects. Baseline data used in this study include the pseudo-intoxicated purchase attempts, establishment observations, and a manager survey. Research protocols were approved by the University of Minnesota Institutional Review Board.

Establishments

Lists of licensed on-premise alcohol establishments (i.e., bars, restaurants) were obtained from the state licensing office for 15 communities—2 cities and 13 communities located in the surrounding suburbs. Additional, newer establishments were identified through city licensing offices and through searches of local news publications. Communities ranged in size from 19,540 to 382,578 and had 20 to 334 on-premise establishments (total establishments across communities = 1,132). Recruitment information was mailed to each establishment on the list within a given community, with research staff following up with telephone recruitment. Of the 1,132 establishments, 283 did not meet eligibility criteria (e.g., had

gone out of business, no longer had a liquor license). Of the 849 where we attempted to contact a manager, 40% ($n = 342$) agreed to participate in the study and were randomly assigned to condition (full intervention or delayed brief intervention). One establishment went out of business prior to completion of baseline data collection and one agreed to participate but never scheduled their initial training, so no purchase attempts were completed at this establishment. Our final number of establishments was 340.

Purchase Attempts/Observations

We conducted pseudo-intoxicated purchase attempts at 340 establishments at baseline (prior to intervention). A buyer, following a standardized protocol, acted out obvious signs of intoxication while attempting to buy alcohol at each study establishment. All buyers were accompanied by an observer who entered with the buyer to observe the interaction between the server and the buyer. We have trained multiple teams of observers and buyers to administer this protocol and conducted more than a thousand purchase attempts using this protocol across multiple studies (Lenk et al., 2006; Toomey et al., 1999, 2004).

Buyers and observers were recruited through advertisements in local newspapers and online job posting sites. Each actor auditioned before a panel of judges who rated the actors' skills at feigning intoxication. The panel included individuals with experience in the hospitality industry. The remaining panel members represented the "reasonable person" recognized by statutory and case law as the standard by which conduct is judged. Actors rated highly by the panel in terms of ability to act obviously intoxicated were chosen for the study. All buyers were provided ongoing training, and regularly monitored by the evaluation coordinator to ensure the study protocol was closely followed and consistently presented across establishments and time.

For each purchase attempt, pseudo-intoxicated buyers entered the establishment while exhibiting very specific intoxication behaviors (e.g., loss of coordination, fumbling with items in the pocket, acting disoriented). Before ordering, the buyer asked several confused questions of the bartender/server while demonstrating slow and slurred speech, inappropriate laughter, and forgetfulness. After asking a few times what kind of beer they serve, the buyer ordered a draft beer. If refused, the buyer typically asked for the time and made an excuse to leave. If the buyer was served, he or she asked twice how much he/she owed, paid the server, and then asked for directions to the rest room. The buyer waited a few minutes, left the drink on the bar or table, and exited the establishment. If at any time the buyer was asked for identification, he/she presented real identification. If asked if he/she was driving, the buyer said he/she was not driving. The observer left the establishment with the buyer as a safety precaution. Upon returning to the car (out of sight of establishment), the buyer and the observer completed report forms that assessed establishment and server characteristics and perceptions about the awareness of the buyer's intoxication level. Visits to all establishments were made between 5:00 PM and 11:00 PM on Friday and Saturday evenings.

Manager Survey

Research staff conducted baseline surveys of the general managers who agreed to participate in the trial. Research staff first attempted to conduct the survey by telephone. If the baseline survey was not completed prior to the first training session, staff brought a hard copy to the first session and invited the managers to complete it prior to beginning the training. We obtained a completed survey at 98% of the establishments (42% by telephone and 58% completed a written version). The survey assessed managers' characteristics, attitudes, perceptions, and confidence regarding policy implementation and responsible service of alcohol.

Measures

The dependent variable was whether the buyer was able to obtain alcohol from their purchase attempt (yes, no). Given the lack of consistency in results across previous studies on factors affecting purchase attempt outcome, we included a wide range of independent variables, focusing on factors that could help guide or target interventions for preventing overservice of alcohol. We measured independent variables across 5 categories: buyer, purchase attempt, server, manager, and establishment/neighborhood characteristics.

Buyer characteristics were gender (male, female) and age (24 to 64 years of age; recoded to a 3-level variable: <30, 30 to 50, >50). Purchase attempt characteristics were obtained from buyer and observer forms and included: time of purchase attempt (before 7 PM vs. 7 PM or later), how crowded the establishment was at the time of the purchase attempt (very crowded, somewhat, or not at all crowded; recoded to very crowded vs. somewhat/not at all), and where the purchase attempt took place (at bar, at table, or in standing room only; dichotomized to at bar vs. table/standing). Server characteristics were also collected through buyer and observer forms: gender (male, female) and perceived age (under 21, 21 to 30, 31+; recoded to <31, 31+).

Manager characteristics were developed using items from the manager survey. Two items were then number of years the manager worked in the service industry (<1 year, 1 to 5 years, 6 to 10 years, >10 years; recoded to ≤10 vs. >10) and how often the manager held staff meetings to discuss solutions to problems servers are having regarding responsible alcohol service (a 6-level variable dichotomized to less than monthly vs. at least monthly). Four measures were based on how strongly managers agreed with a series of statements measured through a 5-point Likert scale that was dichotomized for analyses (strongly agree vs. less agreement). Statements were (i) I will always support my servers' decisions to cut off an intoxicated customer; (ii) management has developed and communicated the steps staff should take when they cut off an intoxicated customer; (iii) when the establishment is open at least 1 manager frequently walks around to monitor staff and customers; and (iv) a business in my community will be cited by licensing or police if they serve alcohol to obviously intoxicated customers.

We created 5 measures of establishment/neighborhood characteristics based on observations and collected on buyer and observer forms: (i) type of establishment (primarily restaurant, primarily bar, equally bar, and restaurant); (ii) type of neighborhood (residential vs. commercial); (iii) quality of establishment (upscale, general, or downscale recoded to upscale vs. general/downscale); (iv) whether security staff was present at the door (yes, no); and (v) number of advertisements for drink specials and happy hours (none, few, many; recoded to none vs. few/many). From the licensing list, we constructed a measure for type of alcohol license (full liquor license vs. beer/wine only) and location (city vs. suburb). Two measures of establishment characteristics were constructed from items from the manager survey, including: (i) establishment has written policies concerning the sale of alcohol (yes, no); and (ii) percentage of front of house staff that has turned over within the past year (<10%, 11 to 25%, 26 to 50%, 51 to 75%, 76 to 100%; dichotomized to ≤25% vs. >25%). At the time of recruitment, research staff requested information about the number of servers in each establishment; from these data, we calculated a server size measure (0 to 150; recoded to a 3-level variable 0 to 9, 10 to 19, 20+). Finally, we created 2 variables from other sources—type of ownership and closing time (on Saturdays). We characterized ownership of the establishments as independent versus corporate, with independent establishments being owned by individuals or families and corporate establishments owned as part of chain or a larger holding company (determined via establishment web sites, Internet searches, and discussions with management). For closing time, we created a dichotomous measure, 11 PM or earlier vs. after 11 PM, as a rough proxy for distinguishing

establishments that are primarily restaurants (that close at or before 9 PM) versus establishments that may be primarily a bar or a combination of a bar and restaurant. We obtained closing time information through establishment web sites and telephone calls to establishments.

In addition, 2 measures pertained to whether the server appeared to notice the buyers' apparent intoxication—reported separately by buyers and observers on a 5-point Likert scale (1 = definitely did not notice, 5 = definitely noticed; recoded to definitely noticed vs. other). These 2 variables are reported as descriptive measures only because they are likely on the causal pathway of serving alcohol to an obviously intoxicated patron. As a potential mediator, we chose not to include it in the model where we trying to identify potential predictors of sales to intoxicated patrons. Recoding on all variables was based on frequency distributions.

Analyses

Following descriptive statistics for all measures, we conducted bivariate analyses (chi-square) to assess the association between each independent variable and the dependent variable. Independent variables that were statistically significant ($p \leq 0.10$) in bivariate analyses were included in a logistic multivariate regression model, controlling for differences in individual buyer's propensity to be sold alcohol and nesting of establishments within community (i.e., included buyer identification and community as random effects). Statistical significance was assessed at the $p < 0.05$ level for the multivariate analyses.

RESULTS

Descriptive Statistics

Pseudo-intoxicated buyers were able to purchase alcohol at 82% of the bars and restaurants. The buyer was male in 50% of purchase attempts, and the buyer was older than 50 years of age in 50% of attempts (Table 1). Purchase attempts were conducted at 7:00 PM or later 50% of the time, in a very crowded setting 22% of time and at the bar (vs. at table or standing) 59% of the time. The server was male in 49% of the purchase attempts and appeared to be 31 or older in 33% of the attempts. The buyer and observer reported that the server definitely noticed the buyer's apparent intoxication level in just over half of the purchase attempts (54 and 53%, respectively; Pearson's correlation $r = 0.55$).

The majority (77%) of the managers of the participating establishments had worked more than 10 years in the hospitality industry. Just over one-third of the managers reported having at least monthly staff meetings to discuss problems that servers may be having regarding responsible alcohol service. The majority of managers strongly agreed that they would always support their servers cutting off service to intoxicated customers (87%), that at least 1 manager frequently walks around to monitor staff and customers (71%), and that a business in their community will be cited by licensing or police if they serve alcohol to obviously intoxicated customers (65%). However, less than half of the managers (40%) strongly agreed that management has developed and communicated the steps staff should take when they cut off an intoxicated customer.

Table 1. Descriptive Statistics for Purchase Attempts, Managers, Establishments, and Neighborhoods

	% (<i>n</i>) of purchase attempts
Buyer characteristics	
Male	50 (169)
Age	
<30	17 (59)
30 to 50	33 (112)
>50	50 (169)
Purchase attempt characteristics	
Time: 7 PM or later	50 (159)
How crowded	
Very	22 (73)
Somewhat/not at all	36 (253)
Location	
At bar	59 (201)
Table/standing	41 (138)
Server definitely noticed intoxication	
Reported by buyer	54 (177)
Reported by observer	53 (172)
Server characteristics	
Male	49 (160)
Perceived age: ≥31	33 (106)
Manager characteristics	
>10 years in industry	77 (260)
At least monthly staff meetings	36 (119)
Will always support servers in cutting off intoxicated customers (strongly agree)	87 (293)
Developed/communicated steps to servers about cutting off patrons (strongly agree)	40 (133)
At least 1 manager monitors establishment (strongly agree)	71 (231)
A business will be cited for selling to intoxicated patrons (strongly agree)	65 (216)
Establishment/neighborhood characteristics	
Type of establishment	
Primarily restaurant	40 (131)
Primarily bar	29 (94)
Equally bar/restaurant	31 (101)
Type of license	
Full liquor	70 (238)
Beer/wine only	30 (102)
Location	
City	64 (217)
Suburb	36 (123)
Type of neighborhood	
Residential	17 (59)
Commercial	83 (281)
Quality of establishment	
Upscale	32 (103)
General/downscale	68 (223)
Type of ownership	
Independent	83 (281)
Corporate	17 (59)
Closing time before or at 11 PM	45 (133)
Security present	9 (32)
No advertisements	61 (200)
Has written policies	64 (214)
Over 25% turnover of front of house staff	28 (94)
Number of servers employed	
0 to 9	32 (109)
10 to 19	29 (99)
20+	39 (132)

The majority of participating establishments were a bar or restaurant/bar (60%), had a full liquor license (70%), were located in a city (64%) versus suburb, were in a commercial

(83%) vs. residential area, were of general/downscale quality (68%), were independently (83%) vs. corporate owned, and closed after 11 PM (55%). The majority of establishments also had no security staff at the door (91%), had no advertisements for drink specials or happy hours (61%), had written policies regarding alcohol service (64%), and had fairly low staff turnover (72%). Approximately a third of establishments employed fewer than 10 alcohol servers and more than a third employed greater than 20 alcohol servers.

Bivariate

Alcohol sales were more likely if the buyer was male and if the buyer was less than 30 or over 50 (Table 2). The only purchase attempt characteristic that was significantly associated with purchase attempt outcome was that a sale was less likely if the establishment was very crowded at time of the purchase attempt. None of server characteristics were significantly associated with purchase attempt outcomes in the bivariate analyses, and only 1 manager characteristic was associated with likelihood of illegal sales—establishments where managers strongly agreed that a business in their community would be cited for selling alcohol to intoxicated customer were more likely to sell alcohol to our buyers. Several establishment characteristics were associated with purchase attempt outcome. Establishments located in the suburbs (vs. city), those that were perceived as not upscale, and those owned by corporations were more likely to serve our buyer. Those that did not have written policies regarding alcohol service and those that employed fewer alcohol servers were more likely to sell to our pseudo-intoxicated buyers.

Multivariate

Only 1 independent variable was significant in the multivariate model (Table 2). Corporate establishments had 3.6 greater odds of selling alcohol to a pseudo-intoxicated buyer compared to independent establishments.

DISCUSSION

We have not made progress in reducing the likelihood of illegal alcohol sales to obviously intoxicated patrons—the large majority (82%) of bars and restaurants sold alcohol to individuals who acted out clear signs of intoxication. In the current study, we found that 4 of 5 attempts by individuals who exhibited obvious signs of alcohol intoxication were served alcohol, despite laws prohibiting this practice. This finding indicates little or no progress from similar sales rates dating to the 1990s (Freisthler et al., 2003; Lenk et al., 2006; McKnight and Streff, 1994; Toomey et al., 1999, 2004). The reason for this lack of progress is no doubt complex. However, it stands in stark contrast to the improvements made in illegal sales to individuals who are under the legal drinking age. In the early 1990s, young purchasers were able to purchase alcohol in the majority of alcohol establishments (~75

Table 2. Bivariate and Multivariate Results: Associations Between Independent Variables and Sales Rate to Pseudo-Intoxicated Buyers

Independent variables	Bivariate		Multivariate Odds ratio (95% confidence interval)
	Sold to pseudo-intoxicated patron ^a	Chi-square (p-value)	
Buyer characteristics			
Gender			
Male	88.0	9.87 (0.002)*	3.69 (0.71, 19.30)
Female	74.4		Referent
Age			
<30	86.2	13.82 (0.001)*	0.65 (0.09, 4.62)
30 to 50	69.3		1.00 (0.15, 6.75)
>50	86.8		Referent
Purchase attempt characteristics			
Time			
Before 7 PM	80.9	0.03 (0.86)	
7 PM or later	81.7		
How crowded			
Very	73.6	4.16 (0.04)*	0.65 (0.30, 1.43)
Somewhat/not at all	84.1		Referent
Location			
At bar	79.2	1.44 (0.23)	—
Table/standing	84.5		
Server characteristics			
Gender			
Male	82.5	0.11 (0.74)	—
Female	81.1		
Perceived age			
<31	82.1	0.38 (0.54)	—
≥31	79.3		
Manager characteristics			
Years in industry			
≤10 years	75.3	2.26 (0.13)	—
>10 years	83.1		
Frequency of staff meetings			
Less than monthly	80.6	0.37 (0.54)	—
At least monthly	83.3		
Will always support servers in cutting off intoxicated customers			
Strongly agree	81.8	0.33 (0.57)	—
Less agreement	78.1		
Developed/communicated steps to servers about cutting off customer			
Strongly agree	84.1	1.08 (0.30)	—
Less agreement	79.5		
At least 1 manager monitors establishment			
Strongly agree	80.8	0.23 (0.63)	—
Less agreement	83.2		
A business will be cited for selling to intoxicated patrons			
Strongly agree	84.5	4.25 (0.04)*	1.74 (0.87, 3.49)
Less agreement	75.0		Referent
Establishment/neighborhood characteristics			
Type of establishment			
Primarily restaurant	86.3	3.96 (0.14)	—
Primarily bar	79.8		
Equally bar/restaurant	76.2		
Type of license			
Full liquor	81.4	0.008 (0.93)	—
Beer/wine only	81.0		
Location			
City	75.9	10.4 (0.001)*	0.59 (0.25, 1.39)
Suburb	90.2		Referent
Type of neighborhood			

Continued.

Table 2. (Continued)

Independent variables	Bivariate		Multivariate Odds ratio (95% confidence interval)
	Sold to pseudo-intoxicated patron ^a	Chi-square (p-value)	
Residential	76.4	1.05 (0.30)	—
Commercial	82.3		
Quality of establishment			
Upscale	75.7	3.06 (0.08)*	0.54 (0.26, 1.15)
General/downscale	83.9		Referent
Type of ownership			
Corporate	91.5	4.96 (0.03)*	3.61 (1.15, 11.31)**
Independent	79.0		Referent
Closing time			
Before or at 11 PM	83.3	0.83 (0.36)	
After 11 PM	79.1		
Security present			
Yes	78.6	0.15 (0.70)	—
No	81.5		
Number of advertisements			
None	81.3	0.08 (0.78)	—
Few/many	82.5		
Has written policies			
Yes	78.3	3.35 (0.07)*	0.48 (0.22, 1.05)
No	86.6		Referent
Percentage of staff turnover			
≤25%	80.9	0.05 (0.83)	—
>25%	81.9		
Number of servers			
0 to 9	90.2	7.90 (0.02)*	1.67 (0.65, 4.30)
10 to 19	76.0		0.96 (0.43, 2.13)
20+	78.1		Referent
Server noticed intoxication (buyer) ^b			
Definitely	66.1	58.7 (<0.0001)	—
Other	99.3		
Server noticed intoxication (observer) ^b			
Definitely	65.3	65.3 (<0.0001)	—
Other	100		

*Significant at $p \leq 0.10$; included in multivariate models; **significant at $p < 0.05$.

^aPercentage of establishments for each level of variable.

^bVariable used only for descriptive purposes.

—, variable not included in model.

to 100%) across communities (Forster et al., 1994, 1995; Preusser and Williams, 1992). More recently, estimates for young appearing buyers have ranged from 26 to 39% across cities (Britt et al., 2006; Freisthler et al., 2003; Paschall et al., 2007; Toomey et al., 2008b).

We found that corporate-owned establishments were more likely to serve alcohol to our pseudo-intoxicated buyers. The reason for this finding is not clear; more research is needed to determine how these corporate establishments differ from independently owned establishments in terms of their policies and training practices. It is possible that the corporate establishments that agreed to participate in our overall study differ from the corporate establishments that refused to participate. However, we found no differences between participants and nonparticipants in this study in terms of license type or location. Furthermore, in a previous study, we did not find

any differences in likelihood of illegal sales to underage or obviously intoxicated patrons between those who agreed to participate in an intervention study versus those that did not (Fabian et al., 2005).

In the multivariate analyses, we did not find an association between the purchase attempt outcomes and any other establishment characteristic or characteristics of the buyer, server, manager, or neighborhood. This finding, combined with the lack of consistent findings across studies in this area, suggests that the potential for overservice of alcohol is pervasive, with all types of on-premise establishments at some risk for illegal sales to obviously intoxicated patrons. It is also possible that researchers have not yet identified or measured critical characteristics that would differentiate among establishments that serve alcohol to obviously intoxicated patron and those that do not.

It is possible that communities are not paying significant attention to the overservice issue. In a recent survey of enforcement agencies, only 55% of state alcohol beverage control agencies and 19% of local police/sheriff agencies indicated they conducted enforcement to address overservice of alcohol despite the fact that 90% of state agencies and 55% of local agencies reported that sales to obviously intoxicated patrons was somewhat or very common in their jurisdictions (Lenk et al., 2014). Most agencies that indicated doing overservice enforcement did not conduct these enforcement efforts regularly. This is consistent with low rates of agreement in our manager survey about the likelihood of being cited for service to intoxicated patrons.

This lack of enforcement targeting overservice of alcohol may be in part due to a lack of resources and also because efficient and cost-effective enforcement methods have not been identified. Local law enforcement agencies were more likely to conduct overservice enforcement if they had a full-time officer specifically assigned to conduct alcohol enforcement efforts (Lenk et al., 2014). A challenge for law enforcement agencies, however, is that there is not a quick way to observe and subsequently penalize establishments for serving alcohol to an obviously intoxicated patron. To prevent sales to underage customers, law enforcement agencies conduct compliance checks where underage youth attempt to purchase alcohol while supervised by law enforcement agents (Erickson et al., 2014). If an alcohol sale is made, the license holder and/or the server is penalized. Compliance checks are effective and can be efficiently conducted in many establishments in 1 night (Wagenaar et al., 2005). In contrast, undercover law enforcement agents may need to sit for hours within 1 establishment before observing a sale to an intoxicated customer. It is not feasible from a liability standpoint for law enforcement agents to conduct compliance checks using persons who are actually intoxicated.

A potential alternative approach would be for law enforcement to do regular, visible observational visits at establishments. Just being aware that law enforcement is conducting these observations may result in a deterrent effect. McKnight and Streff (1994) found this awareness approach may be

effective for reducing overservice of alcohol. This is analogous to roadside drinking and driving checkpoints that result in general deterrent effects without a high likelihood of catching individual offenders (Shults et al., 2001). However, further research is needed to assess the sustainability of effects.

Graham and colleagues (2014) suggest that other challenges to addressing overservice of alcohol through enforcement is the lack of a standardized and validated measure for defining intoxication and the political will to address this issue. They suggest we should adopt principles from the drinking and driving field, including "...applying validated and widely accepted criteria for defining when a person is 'intoxicated'; adopting a structure of enforceable consequences for violations; implementing procedures of unbiased enforcement; using publicity to ensure that there is a perceived high risk of being caught and punished; and developing the political will to support ongoing enforcement" (Graham et al., 2014, p. 693).

A complementary approach to addressing overservice of alcohol is to mandate training to promote responsible alcohol service. As in previous studies, we found that alcohol servers who seemed to recognize that our buyers were intoxicated were significantly less likely to serve alcohol to them. Training programs can encourage servers to observe customers for intoxication level, to recognize signs of intoxication, and then to refuse sales to those who are obviously intoxicated. However, evidence of the effectiveness of responsible beverage service (RBS) training on its own is mixed. A few older, smaller studies suggest that combined manager and server RBS training may reduce BAC levels of customers (Mosher et al., 1989; Saltz, 1987), but other studies have not found significant effects on alcohol sales to obviously intoxicated patrons (e.g., McKnight, 1989). Toomey and colleagues (2008b) evaluated an intensive management training program—Alcohol Risk Management (ARM)—focused on developing establishment policies to promote responsible alcohol sales and found a decrease in likelihood of sales to obviously intoxicated patrons immediately following the training, but the effects decayed within 3 months. More research is needed to determine whether effects from RBS programs such as the ARM Training can be sustained.

This study was limited by a cross-sectional design. Additionally, some of our measures were self-reported by establishment managers, who may have provided socially desirable responses. However, in this and earlier studies (Lenk et al., 2006; Wolfson et al., 1996a,b), we did observe managers of alcohol establishments reporting undesirable attitudes and behavior. Finally, this study was conducted in 1 Midwestern, metropolitan area. Although this limits the generalizability of these findings, this study should be considered as part of the larger literature focused on overservice of alcohol that has previously found a high likelihood of sales of alcohol to obviously intoxicated patrons in many types of venues (Freisthler et al., 2003; Lenk et al., 2006; Toomey et al., 1999, 2004).

In conclusion, the propensity for sales to obviously intoxicated patrons has been assessed in multiple states across

nearly 25 years and different types of venues and found to be consistently high. Given the risks associated with overservice of alcohol, more resources should be devoted first to identify effective interventions for decreasing overservice of alcohol and then to educate practitioners who are working in their communities to address this public health problem.

ACKNOWLEDGMENTS

We would like to thank William Baker who managed all data, Shanda Hunt for assisting with recruitment and data collection, the buyers and observers who collected purchase attempt data, and all manager survey participants. Supported by a grant from the National Institute on Alcohol Abuse and Alcoholism (R01AA018169-01A1; T. Toomey, Principal Investigator). The authors have no conflicts of interest.

REFERENCES

- Aiello SA (1998) State summaries, in: *Liquor Liability Law*, Vol. 2 (Mosher JF ed), Appendix A. M. Bender, New York.
- Andréasson S, Lindewald B, Rehnman C (2000) Over-serving patrons in licensed premises in Stockholm. *Addiction* 95:359–363.
- Britt H, Toomey TL, Dunsuir W, Wagenaar AC (2006) Propensity for and correlates of alcohol sales to underage youth. *J Alcohol Drug Educ* 50:25–42.
- Buvik K (2013) How bartenders relate to intoxicated customers. *Int J Alcohol Drug Res* 2:1–6.
- Cotti C, Dunn RA, Tefft N (2014) Alcohol-impaired motor vehicle crash risk and the location of alcohol purchase. *Soc Sci Med* 108:201–209.
- Erickson DJ, Lenk KM, Sanem JR, Nelson TF, Jones-Webb R, Toomey TL (2014) Current use of underage alcohol compliance checks by enforcement agencies in the United States. *Alcohol Clin Exp Res* 38:1712–1719.
- Fabian LEA, Toomey TL, Mitchell RJ, Erickson DJ, Vessey JT, Wagenaar AC (2005) Do organizations that voluntarily participate in a program differ from non-participating organizations? *Eval Program Plann* 28:161–165.
- Fell JC, Voas RB (2014) The effectiveness of a 0.05 blood alcohol concentration (BAC) limit for driving in the United States. *Addiction* 109:869–874.
- Forster JL, McGovern PG, Wagenaar AC, Wolfson M, Perry CL, Anstine PS (1994) The ability of young people to purchase alcohol without age identification in northeastern Minnesota, USA. *Addiction* 89:699–705.
- Forster JL, Murray DM, Wolfson M, Wagenaar AC (1995) Commercial availability of alcohol to young people: results of alcohol purchase attempts. *Prev Med* 24:342–347.
- Freisthler B, Gruenewald PJ, Treno AJ, Lee J (2003) Evaluating alcohol access and the alcohol environment in neighborhood areas. *Alcohol Clin Exp Res* 27:477–484.
- Gosselt JF, Van Hoof JJ, Goverde MM, De Jong MDT (2013) One more beer? Serving alcohol to pseudo-intoxicated guests in bars. *Alcohol Clin Exp Res* 37:1213–1219.
- Graham K, Miller P, Chikritzhs T, Bellis MA, Clapp JD, Hughes K, Toomey TL, Wells S (2014) Reducing intoxication among bar patrons: some lessons from prevention of drinking and driving. *Addiction* 109:693–698.
- Graham K, Osgood DW, Wells S, Stockwell T (2006) To what extent is intoxication associated with aggression in bars? A multilevel analysis. *J Stud Alcohol* 67:382–390.
- Graham K, Wells S (2001) Aggression among young adults in the social context of the bar. *Addict Res Theory* 9:193–219.
- Lenk KM, Toomey TL, Erickson DJ (2006) Propensity of alcohol establishments to sell to obviously intoxicated patrons. *Alcohol Clin Exp Res* 30:1994–1999.
- Lenk KM, Toomey TL, Nelson TF, Jones-Webb R, Erickson DJ (2014) State and local law enforcement agency efforts to prevent sales to obviously intoxicated patrons. *J Community Health* 39:339–348.
- McKnight JA (1989) Development and Field Test of a Responsible Alcohol Service Program, Volume III: Final Results. Department of Transportation, National Highway Traffic Safety Administration, Washington, DC.
- McKnight JA, Streff FM (1994) The effect of enforcement upon service of alcohol to intoxicated patrons of bars and restaurants. *Accid Anal Prev* 26:79–88.
- Mosher JF, Delewski C, Saltz R, Hennessy M (1989) Monterey-Santa Cruz Responsible Beverage Service Project: Final Report. Marin Institute for the Prevention of Alcohol and Other Drug Problems, San Rafael, CA.
- Mosher JF, Hauck A, Carmona M, Treffers R, Reitz D, Curtis C, Ramirez R, Moore A, Saetta S (2009) Laws Prohibiting Alcohol Sales to Intoxicated Persons. National Highway Traffic Safety Administration, Washington, DC.
- Moskowitz H, Burns MM, Williams AF (1985) Skills performance at low blood alcohol levels. *J Stud Alcohol* 46:482–485.
- Naimi TS, Nelson DE, Brewer RD (2009) Driving after binge drinking. *Am J Prev Med* 37:314–320.
- Paschall MJ, Grube JW, Black C, Flewelling RL, Ringwalt CL, Biglan A (2007) Alcohol outlet characteristics and alcohol sales to youth: results of alcohol purchase surveys in 45 Oregon communities. *Prev Sci* 8:153–159.
- Preusser DF, Williams AF (1992) Sales of alcohol to underage purchasers in three New York counties and Washington, D.C. *J Public Health Pol* 13:306–317.
- Saltz RF (1987) The roles of bars and restaurants in preventing alcohol-impaired driving: an evaluation of server intervention. *Eval Health Prof* 10:5–27.
- Saltz RF, Stanghetta P (1997) A community-wide responsible beverage service program in three communities: early findings. *Addiction* 92 (Suppl 2): S237–S249.
- Savola O, Niemela O, Hillbom M (2005) Alcohol intake and the pattern of trauma in young adults and working aged people admitted after trauma. *Alcohol Alcohol* 40:269–273.
- Shults RA, Elder RW, Sleet DA, Nichols JL, Alao MO, Carande-Kulis VG, Zaza S, Thompson RS (2001) Reviews of evidence regarding interventions to reduce alcohol-impaired driving. *Am J Prev Med* 21 (4 Suppl S):66–88.
- Toomey TL, Erickson DJ, Lenk KM, Kilian GR (2008a) Likelihood of illegal alcohol sales at professional sport stadiums. *Alcohol Clin Exp Res* 32:1859–1864.
- Toomey TL, Erickson DJ, Lenk KM, Kilian GR, Perry CL, Wagenaar AC (2008b) A randomized trial to evaluate a management training program to prevent illegal alcohol sales. *Addiction* 103:405–413.
- Toomey TL, Erickson DJ, Patrek W, Fletcher LA, Wagenaar AC (2005) Illegal alcohol sales and use of alcohol control policies at community festivals. *Public Health Rep* 120:165–173.
- Toomey TL, Wagenaar AC, Erickson DJ, Fletcher LA, Patrek W, Lenk KM (2004) Illegal alcohol sales to obviously intoxicated patrons at licensed establishments. *Alcohol Clin Exp Res* 28:769–774.
- Toomey TL, Wagenaar AC, Kilian G, Fitch O, Rothstein C, Fletcher L (1999) Alcohol sales to pseudo-intoxicated bar patrons. *Public Health Rep* 114:337–342.
- Wagenaar AC, Toomey TL, Erickson DJ (2005) Preventing youth access to alcohol: outcomes from a multi-community time-series trial. *Addiction* 100:335–345.
- Wolfson M, Toomey TL, Forster JL, Wagenaar AC, McGovern PG, Perry CL (1996a) Characteristics, policies, and practices of alcohol outlets and sales to youth. *J Stud Alcohol* 57:670–674.
- Wolfson M, Toomey TL, Murray DM, Forster JL, Short BJ, Wagenaar AC (1996b) Alcohol outlet policies and practices concerning sales to underage people. *Addiction* 91:589–602.